Project Code and Title

B.02.02.08 Electric Vehicle Safety

Project Objective

To identify problems electric vehicles may encounter in complying with existing crashworthiness standards and determine potentially unique electric vehicle safety hazards that may require implementation of new standards.

Background

Federal and state requirements based on environmental concerns are leading manufacturers to develop electric vehicles that will be marketed in significant numbers within the next few years. A regulation of the California Air Resources Board requires that two percent of a manufacturer's sales (roughly estimated to be 40,000 vehicles total) must be zero emission vehicles (ZEV's) beginning in model year 1998, and will increase the requirement to 10 percent by model year 2003. There are 13 other states with similar legislation pending.

Problem Definition

Design, weight and weight distribution for electric vehicles may be such that compliance with existing crashworthiness safety standards will pose difficulties. Additionally, there are potential hazards during a crash of electric shock, contact with toxic electrolytes, and battery system explosion.

Research Approach

The proposed project tasks will (1) examine existing safety practices involved in manufacture and testing of batteries and electric propulsion equipment , (2) review safety standards concerning shock levels, battery explosion and exposure limits to hazardous chemicals, (3) locate and review accident and crash test data, (4) develop model of EV crash test to compare response to that of a conventional ICE vehicle, (5) develop a crash test procedure that quantifies exposure to shock or hazardous chemicals, (6) test available vehicles for compliance with existing FMVSS, (7) implement EV specific safety tests.

Potential Impact/Application

Modification of existing crashworthiness standards and implementation of new standards developed for EV's.

Key Milestones

- EV crash tests (6) conducted between 1993 and 1995.

RESOURCE REQUIREMENTS	FY	FY	FY	FY	FY
Contract Money ($K)	275	100			

Project Manager(s)

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Completion Date

Work is dependent upon introduction of EV's to marketplace.

Publications

1. DOT HS 808 311, Final Report of a 1993 Solectria Force into a Flat Frontal Barrier (Test 1982)

2. DOT HS 808 312, Final Report of a 1993 Sebring ZEV into Flat Frontal Barrier (Test 2018)

3. DOT HS 808 305, Moving Deformable Barrier into Left Side of 1995 Solectria Force at 52.9 kph, (Test 2301)

4. DOT HS 808 304, Final Report of a Solectria 4-Door Sedan into Flat Drontal Barrier at 48.1 kph (Test 2302)

5. DOT HS 808 313, Final Report of a 1995 Solectria E-10 Pickup into Flat Frontal Barrier (Test 2251)

6. DOT HS 808 307, Final Re[port of a Renaissance Cars Tropica Roadster into Flat Frontal Barrier at 47.6 kph (Test2303)

Keywords: Battery, Electric, EV, Electrolyte, Shock

Project Tasks

Task	Title and Description
Task 1	Review Battery Safety Practices
Task 2	Review Industry Standards for EV's
Task 3	Perform Literature Search
Task 4	Crash Test Simulation of Developmental EV's
Task 5	EV Test Procedure Development
Task 6	Test for Compliance with Existing FMVSS
Task 7	Implementation of EV Specific Safety Tests

Task	Start Date	Projected Completion Date	Status/Responsibility
1	05/92	------	ongoing
2	05/92	------	ongoing
3	07/92	12/92	complete
4	------	------	planned
5	01/93	01/98	ongoing-dependent on introduction of new vehicle technology
6	02/93	01/98	ongoing
7	07/93	01/98	ongoing-includes review of SAE recommended practices for EV’s